

特种滤光片:

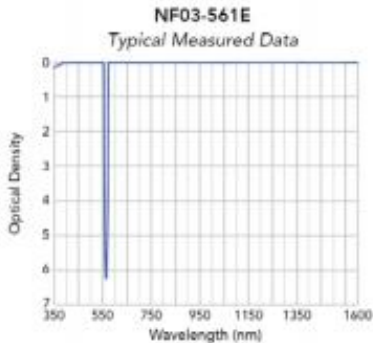
陷波滤光片(Notch Filter)

Semrock 可以提供单波长的陷波滤光片, 还有多波长的陷波滤光片。

Notch指标说明:

Property	Value	Comment
Laser Line Blocking:	"E" & "U" grade > 6 OD	At the design laser wavelength; OD = -log ₁₀ (transmission)
Typical 50% Notch Bandwidth	"E" & "U" grade $NBW = 55 \times 10^{-6} \times \lambda_L^2 + 14 \times 10^{-3} \times \lambda_L - 5.9$ e.g. 17 nm (600 nm) for 532.0 nm filter	Full width at 50% transmission; λ_L is design laser wavelength (NBW and λ_L in nm)
Maximum 50% Notch Bandwidth	< 1.1 × NBW	
90% Notch Bandwidth	< 1.3 × NBW ^{III}	Full width at 90% transmission
Passband	"E" grade 350 – 1600 nm "U" grade from $0.75 \times \lambda_L$ to $\lambda_L / 0.75$ ^{III}	Excluding notch λ_L is design laser wavelength (nm)
Average Passband Transmission	"E" grade > 80% 350 – 400 nm, > 93% 400 – 1600 nm "U" grade > 90%	Excluding notch Lowest wavelength is 330 nm for NF03-405E
Passband Transmission Ripple	< 2.5%	Calculated as standard deviation
Angle of Incidence	$0.0^\circ \pm 5.0^\circ$	See technical note on page 102
Angle Tuning Range ^{II}	- 1% of laser wavelength (- 5.3 nm or + 190 nm for 532 nm filter)	Wavelength "blue-shift" attained by increasing angle from 0° to 14°
Laser Damage Threshold	1 J/cm ² @ 532 nm (10 ns pulse width)	Tested for 532 nm filter only (see page 106)
Coating Type	"Hard" ion-beam-sputtered	
Clear Aperture	≥ 22 mm	For all optical specifications
Outer Diameter	25.0 + 0.0 / - 0.1 mm	Black-anodized aluminum ring
Overall Thickness	3.5 ± 0.1 mm	Black-anodized aluminum ring

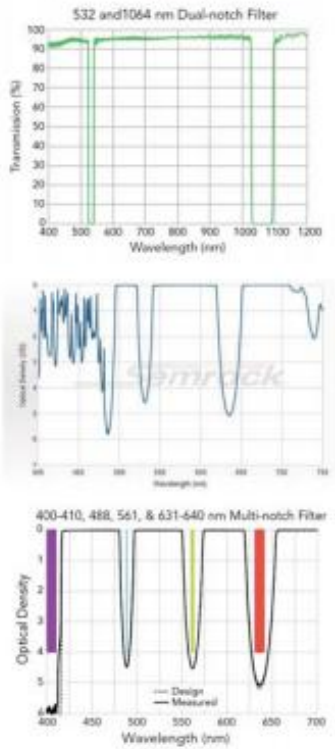
单波长Notch曲线图例:



单波长Notch选型表:

Wavelength	Passband Range	Typical 50% Notch Bandwidth	Laser-line Blocking	Part Number
405.0 nm	330.0 – 1600.0 nm	9 nm	OD > 6	NF03-405E-25
488.0 nm	350.0 – 1600.0 nm	14 nm	OD > 6	NF03-488E-25
514.5 nm	350.0 – 1600.0 nm	16 nm	OD > 6	NF03-514E-25
532.0 nm	350.0 – 1600.0 nm 399.0 – 709.3 nm	17 nm 17 nm	OD > 6 OD > 6	NF03-532E-25 NF01-532U-25
561.4 nm	350.0 – 1600.0 nm	19 nm	OD > 6	NF03-561E-25
594.1 nm	350.0 – 1600.0 nm	22 nm	OD > 6	NF03-594E-25
632.8 nm	350.0 – 1600.0 nm	25 nm	OD > 6	NF03-633E-25
658.0 nm	350.0 – 1600.0 nm	27 nm	OD > 6	NF03-658E-25
785.0 nm	350.0 – 1600.0 nm	39 nm	OD > 6	NF03-785E-25
808.0 nm	350.0 – 1600.0 nm	41 nm	OD > 6	NF03-808E-25

多波长Notch曲线图例:



多波长Notch选型表:

Laser Wavelengths	Laser-line Blocking	Part Number	Dimensions
Dual-notch Filters			
488 & 532 nm	OD > 6	NF01-488/532-25x5.0	25 mm x 5.0 mm
488 & 543 nm	OD > 6	NF01-488/543-25x5.0	25 mm x 5.0 mm
488 - 490 & 631 - 640 nm	OD > 4	NF01-488/635-25x5.0	25 mm x 5.0 mm
488 & 647 nm	OD > 6	NF01-488/647-25x5.0	25 mm x 5.0 mm
532 & 1064 nm	OD > 6	NF03-532/1064E-25	25 mm x 3.5 mm
543 & 647 nm	OD > 6	NF01-543/647-25x5.0	25 mm x 5.0 mm
568 & 638 nm	OD > 6	NF01-568/638-25x5.0	25 mm x 5.0 mm
568 & 647 nm	OD > 6	NF01-568/647-25x5.0	25 mm x 5.0 mm
594 & 638 nm	OD > 6	NF01-594/638-25x5.0	25 mm x 5.0 mm
Triple-notch Filters			
488, 532, & 631-640 nm	OD > 4	NF01-488/532/635-25x5.0	25 mm x 5.0 mm
Quadruple-notch Filters			
400 - 410, 488, 532, & 631 - 640 nm	OD > 4	NF01-405/488/532/635-25x5.0	25 mm x 5.0 mm
400 - 410, 488, 561, & 631 - 640 nm	OD > 4	NF01-405/488/561/635-25x5.0	25 mm x 5.0 mm
400- 410, 488 - 490, 555 - 558, & 640 nm	OD > 4	NF01-405/488/557/640-25x5.0-D	25 mm x 5.0 mm

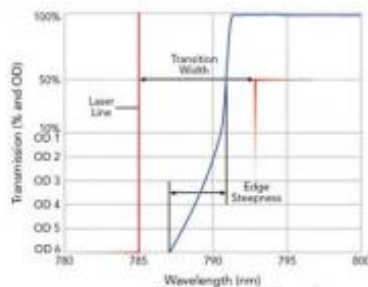
边沿截止滤光片(Edge Filter)

Semrock 的 Edge Filter 根据截止边沿的“陡度”(Steepness), 分为两个大系列, 四个等级。其中 RazorEdge® 系列主要用于激光拉曼实验, 属于世界顶级的 Edge Filter。而 EdgeBasic™ 系列是价格较便宜的高性能 Edge Filter。

关于陡度和级别划分的说明:

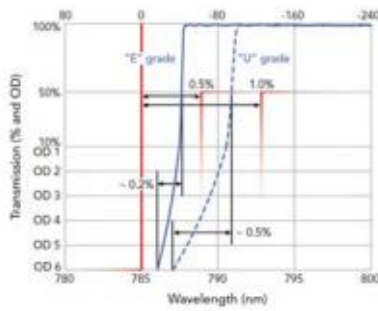
Edge Filter Type	Guaranteed Transition Width (% of laser wavelength)	Typical Edge Steepness (% of laser wavelength)
RazorEdge "E-grade"	< 0.5% (< 90 cm ⁻¹ for 532)	0.2% (1.1 nm for 532)
RazorEdge "U-grade"	< 1.0% (< 186 cm ⁻¹ for 532)	0.5% (2.7 nm for 532)
RazorEdge "S-grade"	< 2.0% (< 369 cm ⁻¹ for 532)	0.5% (2.7 nm for 532)
EdgeBasic	< 2.5% (< 458 cm ⁻¹ for 532)	1.5% (8.0 nm for 532)

EdgeBasic™系列的指标说明:



EdgeBasic™系列选型表:

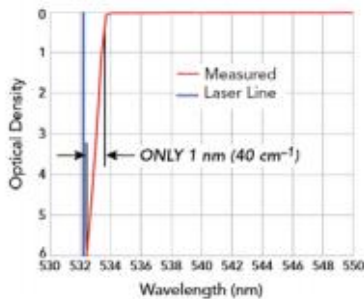
Property	Value	Comments
Edge Steepness (typical)	1.5% of λ_{long}	Measured from OD 6 to 50%
Blocking at Laser Wavelengths	OD > 6 from 80% of λ_{short} to λ_{long} OD > 5 from 270 nm to 80% of λ_{short}	OD = -log ₁₀ (transmission)
Transition Width	< 2.5% of λ_{long}	From λ_{long} to the 50% transmission wavelength
Guaranteed Transmission	> 93%	Averaged over the passband
Typical Transmission	> 98%	Averaged over the passband
Minimum Transmission	> 90%	Over the passband
Angle of Incidence	0.0° ± 2.0°	Range for above optical specifications
Cone Half Angle	< 5°	Rays uniformly distributed about 0°
Angle Tuning Range	± 0.3% of Laser Wavelength	Wavelength "blue shift" increasing angle from 0° to 8°
Substrate Material	Low autofluorescence optical quality glass	
Clear Aperture	> 22 mm	
Outer Diameter	25.0 ± 0.1 mm	Black-anodized aluminum ring
Overall Thickness	3.5 ± 0.1 mm	Black-anodized aluminum ring
Beam Deviation	< 10 arc seconds	
Surface Quality	60-40 scratch-dig	
Filter Orientation	Arrow on ring indicates preferred direction of propagation of light	



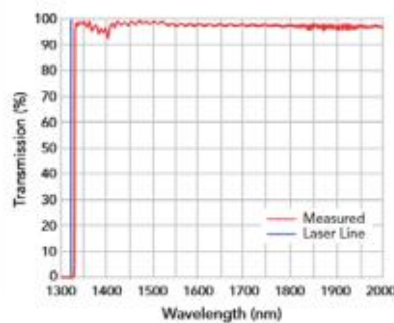
Nominal Laser Wavelength	Laser Wavelength Range		Passband	Part Number
	λ_{short}	λ_{long}		
405 nm	400.0 nm	410.0 nm	421.5 – 900.0 nm	BLP01-405R-25
458 nm	439.0 nm	457.9 nm	470.0 – 900.0 nm	BLP01-458R-25
488 nm	486.0 nm	491.0 nm	504.7 – 900.0 nm	BLP01-488R-25
515 nm	505.0 nm	515.0 nm	529.4 – 900.0 nm	BLP01-514R-25
532 nm	532.0 nm	532.0 nm	546.9 – 900.0 nm	BLP01-532R-25
594 nm	593.5 nm	594.1 nm	610.6 – 900.0 nm	BLP01-594R-25
635 nm	632.8 nm	642.0 nm	660.0 – 1200.0 nm	BLP01-635R-25
785 nm	780.0 nm	790.0 nm	812.1 – 1200.0 nm	BLP01-785R-25

RazorEdge®系列图例:

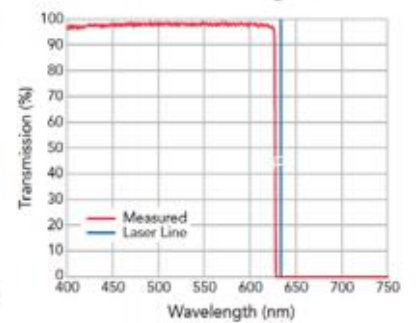
RazorEdge Raman Filter Spectra
Actual measured OD for a 532 nm E-grade filter



Expand deeper into the IR
(see page 96 for Near-IR bandpass filters)
Actual measured 1319 U-grade filter



Actual measured data from a 632.8 nm RazorEdge filter



选型表一: 短波通Edge Filter

Laser Line	Transition Width	Passband	Part Number
532.0 nm	< 186 cm ⁻¹	350.0 – 525.2 nm	SP01-532RU-25
561.4 nm	< 176 cm ⁻¹	400.0 – 554.1 nm	SP01-561RU-25
632.8 nm	< 160 cm ⁻¹	372.0 – 624.6 nm	SP01-633RU-25
785.0 nm	< 129 cm ⁻¹	400.0 – 774.8 nm	SP01-785RU-25

选型表二: 长波通Edge Filter

Laser Line	Transition Width [1]	Passband	Part Number
224.3 nm	< 1920 cm ⁻¹	235.0-505.9 nm	LP02-224R-25
248.6 nm	< 805 cm ⁻¹	261.0-560.8 nm	LP02-248RS-25
257.3 nm	< 385 cm ⁻¹	263.0-580.4 nm	LP02-257RU-25
266.0 nm	< 372 cm ⁻¹	272.4-600.0 nm	LP02-266RU-25
325.0 nm	< 305 cm ⁻¹	329.2-733.1 nm	LP03-325RU-25
355.0 nm	< 140 cm ⁻¹	357.3-800.8 nm	LP02-355RE-25
	< 279 cm ⁻¹	359.6-800.8 nm	LP02-355RU-25
363.8 nm	< 272 cm ⁻¹	368.5-820.6 nm	LP02-364RU-25
441.6 nm	< 224 cm ⁻¹	447.3-996.1 nm	LP02-442RU-25
457.9 nm	< 216 cm ⁻¹	463.9-668.4 nm	LP02-458RU-25
473.0 nm	< 209 cm ⁻¹	479.1-1066.9 nm	LP02-473RU-25
488.0 nm	< 102 cm ⁻¹	491.2-1100.8 nm	LP02-488RE-25
	< 203 cm ⁻¹	494.3-1100.8 nm	LP02-488RU-25

Laser Line	Transition Width [1]	Passband	Part Number
514.5 nm	< 97 cm ⁻¹	517.8-1160.5 nm	LP02-514RE-25
	< 192 cm ⁻¹	521.2-1160.5 nm	LP02-514RU-25
532.0 nm	< 90 cm ⁻¹	535.4-1200.0 nm	LP03-532RE-25
	< 186 cm ⁻¹	538.9-1200.0 nm	LP03-532RU-25
561.4 nm	< 176 cm ⁻¹	568.7-1266.3 nm	LP02-561RU-25
568.2 nm	< 174 cm ⁻¹	575.6-1281.7 nm	LP02-568RU-25
632.8 nm	< 79 cm ⁻¹	636.9-1427.4 nm	LP02-633RE-25
	< 156 cm ⁻¹	641.0-1427.4 nm	LP02-633RU-25
664.0 nm	< 149 cm ⁻¹	672.6-1497.7 nm	LP02-664RU-25
780.0 nm	< 127 cm ⁻¹	790.1-1759.4 nm	LP02-780RU-25
785.0 nm	< 63 cm ⁻¹	790.1-1770.7 nm	LP02-785RE-25
	< 126 cm ⁻¹	795.2-1770.7 nm	LP02-785RU-25
808.0 nm	< 123 cm ⁻¹	818.5-1822.6 nm	LP02-808RU-25
830.0 nm	< 119 cm ⁻¹	840.8-1872.2 nm	LP02-830RU-25
980.0 nm	< 101 cm ⁻¹	992.7-2000.0 nm	LP02-980RU-25
1064.0 nm	< 93 cm ⁻¹	1077.8-2000.0 nm	LP02-1064RU-25
1319.0 nm	< 75 cm ⁻¹	1336.1-2000.0 nm	LP02-1319RU-25